

REMARKS

This application has been amended so as to place it in condition for allowance at the time of the next Official Action.

The Official Action objects to the drawings for lacking proper labeling. Please note that applicant has carefully reviewed the application and amended drawing Figures 1-4a as necessary in order to provide the proper text description of the boxes originally identified only by reference numeral. The modifications of the drawing figures consist entirely of the addition of the text listed below corresponding to the boxes identified by the reference numerals also listed below:

infrared optical apparatus	10
image detector	30
processing unit	40
processing unit input	42
processing unit output	44
moving means	50
moving means input	52
radiometric instrumentation	100
radiometric instrumentation input	102
radiometric instrumentation output	104
calibration device	110
calibration device input	112
calibration device output	116
thermometer	120
movement detection device	130
movement detection device input	132
movement detection device output	134
compiling unit	140
analysing unit	150
memory location	160.

The Official Action rejects claims 16 and 30 under 35 USC §112, second paragraph, as being indefinite. Please note that applicant has amended each of the identified claims in order

to eliminate the language identified as underlying this rejection. Reconsideration and withdrawal of such rejection are therefore respectfully requested.

The Official Action rejects claims 1 and 24 under 35 USC §102(e) as being anticipated by SUDA et al. 6,088,060 ('060). Reconsideration and withdrawal of this rejection are respectfully requested for the following reasons:

The present invention relates to an image analyzing focusing device for an infrared optical apparatus. The Office action suggests that the device of SUDA et al. ('060) can be used in the infrared optical region. However, the infrared application of the present invention is not merely intended use, but also implies specific technical features. Thus, the claims are considered as limited in that the claimed device is specifically adapted to particularly demanding conditions of focusing devices in the infrared optical range. To clarify this, applicant has amended each of the rejected independent claims to specifically recite that the apparatus (claim 1) and the method (claim 24) are directed to focusing light in the infrared range.

Therefore, the present invention is anticipated neither by any the applied SUDA et al. ('060) reference, nor by any of the other cited references that include SUDA as a named inventor (SUDA et al. ('858) and SUDA ('246)). None of the cited references include all features of the independent claims, and thus independent claims 1 and 24 are believed to be novel.

The Official Action rejects a number of other claims under 35 USC §103(a) as being unpatentable over SUDA et al. ('060) in view of additional references, namely: claims 2 and 25 in view of SUDA et al. 5,739,858 ('858); claims 3 and 26 in view of SUDA et al. ('858) as applied to claim 2 above, and further in view of PETTERSSON et al. 6,341,180; claims 4-8, 17, 19-21, 23 and 30 in view of WILLIAMS et al. 6,281,970; claim 9 in view of SATO et al. 5,861,915; claim 14 in view of SUDA 6,556,246 ('246); claims 15 and 16 in view of KANEDA 6,246,437; claim 18 in view of MCINTYRE et al. 5,752,115; and claim 22 in view of LEE 6,507,366.

Reconsideration and withdrawal of each of these rejections are respectfully requested for the following reasons:

Underlying each of these obviousness rejections is the reliance upon the primary SUDA et al. ('060) reference for teaching the majority of the recited features. Applicant will demonstrate why the primary reference fails to teach or suggest that for which it is offered, a result of which is the failure of each prior art combination to render obvious the full set of features recited in each rejected claim.

In the description in the specification as originally filed on page 14, second paragraph, it is explained that the present invention relates to an infrared optical system. An automatic focusing arrangement of such a system requires a different and more complex focusing procedure, due to the low

energy content of the infrared radiation, as compared with a visible light focusing arrangement, in which the energy content is considerably higher. Common general knowledge in the field regarding standard SLR cameras, such as Nikon F5 and Canon EOS1, all relate to visible light focusing arrangements. Also video cameras for use in visible light conditions are inapplicable to the present invention, in which infrared radiation is dealt with in contrast with standard SLR-cameras or video cameras as described in SUDA et al. ('060), SUDA et al. ('858) and SUDA ('246).

SUDA et al. ('060) represents the closest prior art, and its features represent the basis with respect to which the present invention of independent claims 1 and 24 makes a novel and nonobvious improvement. SUDA et al. ('060) describes a method for automatically focusing a video camera. A first embodiment of the SUDA et al. ('060) device is meant to produce good results for images having a great deal of high frequencies. In a second embodiment thereof, the device produces good results for images that may have fewer details, and hence lower frequency content.

The problem sought to be solved by the SUDA et al. ('060) approach is to provide an automatic focusing method which allows the lens to be continuously focused on the main object even when the main object changes position within the image plane (column 2, lines 13-16). However, based on the method described

in SUDA et al. ('060) where images are analyzed with the aid of at least one operator producing a first derivative of high spatial frequency components for a field, it is questionable whether the method is applicable for images having only vague details, such as a wall representing an image predominantly containing low frequencies, in particular when the temperature within the image is fluctuating, thereby creating disturbing noise that may be mistaken for image details. The method of SUDA et al. ('060) is not suitable for identifying objects within the image, and consequently, the method is intended primarily to be used for tracing identified objects.

The present invention instead has the object to introduce a powerful and efficient search operation for use in automatic focusing systems (page 2, last paragraph). The problem inherent in the approach of SUDA et al. ('060) is solved by the features of independent claims 1 and 24. The image analyzing focusing device and corresponding method according to independent claims 1 and 24 are variable, so as to be applicable to images having only vague details, i.e., an image predominantly containing low spatial frequencies, or for images having higher frequencies. They are also applicable in a case when the temperature within the image is fluctuating. A variable iterative process is controlled by different parameters so as to find the optimum focus function for a certain range of the spatial frequency content of the image. An infrared optical

apparatus utilizing the search operation according to the invention may have its image continuously well focused. By means of the present invention, it is possible to tailor the filtering process in a way that reliably speeds up the focusing procedure substantially and suits the current infrared system optimally (page 13, last paragraph). Since the present invention has several useful and inventive advantages that are impossible to achieve by means of the technology described in SUDA et al. ('060), the invention of the present claims is believed to be non-obvious.

A person skilled in the art does not find any guidance towards the present invention having a variable iterative process for reaching a focused image with improved speed and reliability. In particular, this is the case for a variable process enabling focusing of images having unfavorable and difficult frequency ranges when reading SUDA et al. ('060). On the contrary, the skilled person would be encouraged by the teachings of SUDA et al. ('060) to develop a method for tracing focused objects instead of a powerful and efficient algorithm requiring modern computing capacity such that of the present invention.

Hence, the prior art technology of SUDA et al. ('060) does not disclose subject matter making the present invention obvious to a person skilled in the art.

In addition to the amendments described above, applicant has added new claims 31-34. Of these, claims 31 and 33

depend from independent claims 1 and 24, respectively. Claims 32 and 34 further depend from new claims 31 and 33, respectively.

Each of the first set of claims recites that the iterative process is a variable iterative process that operates so as to maximize contrast. Each of the second set of new claims further recites that the iterative process is selective based on spatial frequencies of the image.

Applicant notes that such features are described in the present specification as originally filed at least on page 12, lines 28-30. Moreover, such features are neither disclosed, taught nor suggested by any of the known prior art, considered either individually or collectively. Accordingly, such claims are believed to be allowable both by virtue of their ultimate dependence from the existing independent claims, as well as by virtue of the features explicitly recited by such new claims.

Applicant notes that claims 10-13 and 27-29 are indicated by the Office action to be allowable but for their dependence from rejected base claims. Applicant suggests that, based on the present amendments and arguments, such claims and all other claims in the application are believed to be in condition for immediate allowance.

Please charge the fee of \$72 for the four extra claims of any type added herewith, to Deposit Account No. 25-0120.

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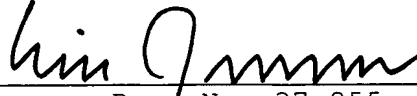
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fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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